
PROJECT DEFINITION REPORT

S151 STRUCTURE REPLACEMENT

PS ID 100833

APRIL 18, 2013

REVISION #0



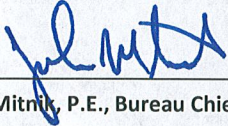
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Approvals


The signatures in this section of the project definition report should be revised to represent the various areas providing significant resources to the project.



John Mitnik, P.E., Bureau Chief, Engineering and Construction

4/26/13

Date



Michael Gallagher, Bureau Chief, Field Operations South

4/30/13

Date

Document prepared by: Jerry Gresh , Extension: 2628

Project Location

Structure S151 is located in Water Conservation Area (WCA) 3A at the intersection of the Miami Canal (C-304) and L-67A Canal (Figure 1), which is approximately 4 miles southwest of the S9 Pump Station.

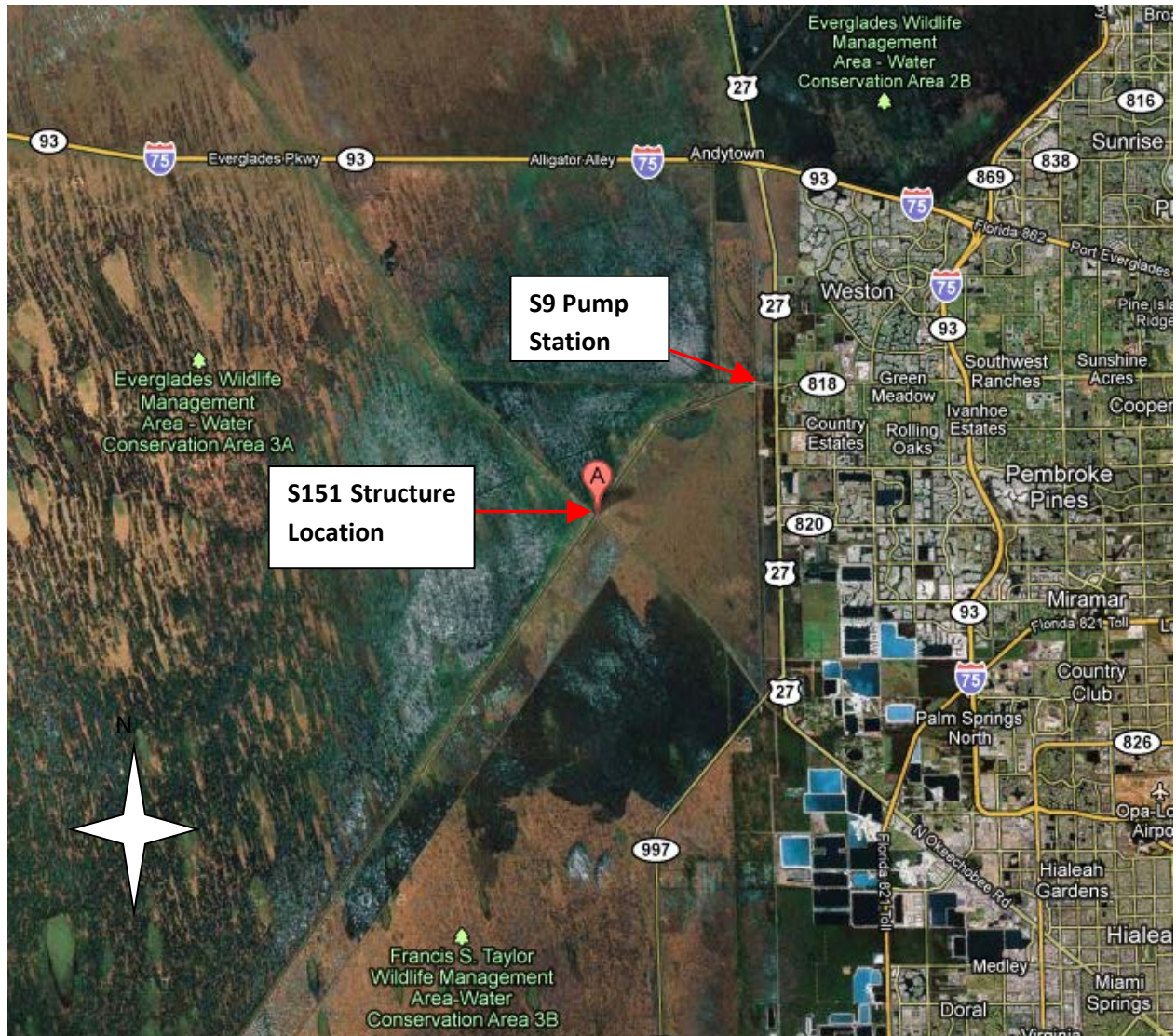


Figure 1 – Project Location

Project Description

The S151 Structure consists of six (6), 84-inch, corrugated metal pipe culverts, located at the point where L-67A crosses the Miami Canal, about 20 miles west of Miami. Control is affected by six manually operated sluice gates mounted on a steel frame erected on the upstream side of the structure. The structure allows release of water from WCA 3A to meet water needs for South Miami-Dade County

along the Miami Canal (C-6), C-7 and C-8 during the dry season. It can also be used to discharge excess water to tide from WCA 3A and 3B, when capacity is available in the Miami Canal.

Project Scope

The scope of project is to replace the existing structure with a new structure that has the same flow capability based upon the three alternatives discussed below. This will require a new structure design and preparation of the required bid documents to solicit bid proposals. The demolition of the existing structure and construction of the new structure can only occur in the dry season. The ability to maintain flow during the period of construction will be required. In addition, design and installation of a cofferdam with a dewatering system needs to be considered in the preferred design alternative.

Background

This structure allows release of water from WCA 3A to supply water needs to South Dade County and along the Miami Canal (C-6), C-7 and C-8 during the dry season. It can also be used to discharge excess water from WCA 3A into 3B, when capacity of 3A is exceeded.

In 2004, the results of a routine inspection revealed that the culverts were badly deteriorated and needed to be replaced. Since this structure is also located within the footprint of a future Comprehensive Everglades Restoration Plan (CERP) project (WCA 3 Decompartmentalization & Sheet Flow Enhancement – also known as DECOMP), decisions were made at that time to temporarily repair the culverts until the design elements and features of the referenced CERP project were better defined. A pilot project was completed where sections of some of the culverts were repaired with the installation of a PVC pipe sleeve with high pressure grout injected into the annular space between the corrugated pipe and PVC pipe sleeve. However, this pilot project proved unsuccessful as the majority of the installed pipe sleeves failed.

Additional routine inspections over the years have also determined that the structure could no longer be considered reliable to function in accordance with its requirements. While the status of the planned CERP project in this area is unknown as this time, replacement of the S151 Structure is critical and should be considered so that the District can continue to meet its obligations as they relate to water supply, flood control and water quality.

Permitting

This project will not alter or change the Central & Southern Florida Flood Control Project. The project will replace the present structure with a new structure that provides the same performance as the present S151 Structure. The new structure will provide no changes to the existing drainage patterns. However, the following permits may need to be obtained prior to the start of construction:

- U.S. Army Corps of Engineers (USACE) Section 404 permit and Section 408 authorization,
- Florida Department of Environmental Protection Everglades Forever Act permit

-
- Broward County Environmental and Storm Water Permit.

Right of Way

The project does not impact or alter any right-of-way permits. No utilities are involved with the project that affect or require modification.

Real Estate

The District owns the underlying and surrounding lands. No utilities are involved with the project that affect or require modification.

Public Use

There is no public use associated with the project. All roads to the structure have locked gates and the structure is located four miles from the levee in WCA 3.

Stakeholder Considerations

The Fort Lauderdale Field Station requires a dependable operating situation for the S151 Structure as it provides water supply throughout Miami-Dade County. Without this structure the county would lose a significant water supply source. There are no regulatory mandates associated with the project.

The USACE has been developing the WCA 3 Decompartmentalization & Sheet Flow Enhancement Project (DECOMP) since 2002. Part of the DECOMP project includes the backfilling of portions of the Miami Canal at S151 and segments of the L-67A which could impact or modify the operations of S151. The DECOMP project is currently in the Project Implementation phase and is currently on hold. The final design alternative selected for the S151 Structure replacement should factor in the scope and timing of the DECOMP project.

Public Outreach

There are no public outreach requirements for this project.

Operations

The Water Control Operations Bureau has requested that during the construction of the new structure, one half (1/2) of the design flow must be available in the dry season and full design flow must be available during the wet season. No other structures are impacted.

Operations and Maintenance

This project lies within the Fort Lauderdale Field Station's area of responsibility. This project has been coordinated with their staff and the District's Water Control Operations Bureau.

SCADA, Instrumentation, Telemetry

No SCADA, instrumentation, telemetry or electrical power is required for the project.

Security

There are no security requirements for the project.

Information Technology

No IT requirements are necessary for the project.

Environmental

The project does not adversely impact existing wetlands or sensitive areas and is simply an in-kind replacement of the existing structure in the same location. There may be endangered species present in the general location of the structure. Impacts will be either avoided or minimized through best management practices. There are no tribal lands in the area.

Monitoring

Monitoring for Manatees, Crusted Caracaras, Panthers and turbidity during construction may have to be implemented based upon the permit requirements.

Commissioning

A commissioning plan is required to insure proper operation. Mechanical and gate operator expertise will be required.

Lessons Learned

The failure of the present structure is due to steel corrosion of the gate structure and corrugated barrels. The new structure design should consider the options of utilizing aluminum, stainless steel or concrete.

Conceptual Alternative Options

The three conceptual design alternatives to be considered are as follows.

Option 1:

Replace existing culverts in-kind with same six (6), 84-inch diameter by 98-foot long corrugated metal (aluminum) pipes with associated manually operated slide gates and platform. This option will require the installation of the culverts in two phases while utilizing the portions of the existing culverts as a bypass or other acceptable bypass systems during construction. Installation of a cofferdam with a dewatering system will also be required in both phases.

Option 2:

Same as option 1 with a reduced length in the culvert pipe from 98 feet to 60 feet, which will also reduce the amount of backfill material and change the levee configuration. This option will have a concrete headwall, sheet-pile wing walls with concrete cap with manually operated slide gates and a dewatering maintenance stop log system.

Option 3:

Replace existing six (6), 84-inch diameter by 98-foot long corrugated metal pipe culverts with cast in place concrete box culverts with wing walls, stop log concrete recess, stainless steel slide gates and platform. This option will require the installation of the concrete box culverts in two phases while utilizing the portions of the existing culverts as a bypass or other acceptable bypass systems during construction. Installation of a cofferdam with a dewatering system will also be required in both phases.

For cost estimating purposes, four (4), ten (10)-foot wide by seven (7)-foot high cast in-place concrete box culverts, 60 feet in length has been assumed in this option. The final size and configuration of the cast in place concrete culverts will be determined during design.

Cost Estimates

The project detailed conceptual cost estimate can be found in Appendix A. The conceptual cost is estimated at between \$2.36 M and \$3.25 M, depending on selected alternative.

- Option 1: \$2,366,372
- Option 2: \$2,877,094
- Option 3: \$3,252,372

Recommendations

With the direction and status of the CERP WCA 3 DECOMP project unknown, the replacement of the S151 Structure was discussed with the Federal Policy & Coordination Section where it was confirmed that the replacement of the structure is not potentially inconsistent with CERP. Further discussions indicated that the S151 Structure will probably remain in place and may become part of the long term plan for the area. Since it is unknown when the DECOMP project under the CERP plan will be

implemented and considering the poor condition of S151, it is recommended that the present structure be replaced as soon as possible.

Based upon the three conceptual design alternatives evaluated and considering the fact that the structure will be a permanent long term structure supplying water to the Miami area, Option 3 - the concrete box culvert design with dewatering capability would provide the longest life with the least maintenance as compared to Options 1 & 2 - metal culvert designs. Option 1, the metal culvert design without dewatering maintenance capability is not considered cost effective due to the expense of coffer damming the structure in the event that maintenance is required.

Project Milestones

- Engineering Design FY15
- Construction FY16/FY17

Resource Requirements

List Functions	Skill of Functional Employees	Identify Employees	Total FTEs/Hrs Required for Complete Project
Engineering	Civil, Structural, CADD, Geotech		1840
Permitting	Scientist		120
Project/Construction Manager	PM/CM, CI		800
Survey	Surveyor		160
Total Resource Requirements			2920 Hrs.

Project Deliverable and Schedule

Fiscal Year	Deliverable	Schedule
FY 15	Survey	1.5 Months
FY15	Geotechnical	1.5 Months
FY15	Design	8 Months
	R/W Coordination	0
	Land Coordination	0
	Public Outreach	0
FY15	Permitting	Concurrent with Design
FY15/FY16	Bid Process	2 Months
FY15	Notice to Proceed	November 1
FY15/FY16	Construction	12 Months

Project Funding Sources

The funding source will be from O & M Capital Budget functional area CA04.

References

S151 issued ID. <http://webtop.cerpzone.org/webtop/drl/objectId/0b009f5783071073>

Photographs





Appendix A - Cost Estimate

JACK ISMALON
LEAD COST ESTIMATOR

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

1
11/15/11
1:16 pm

Bid Item Cost Only w/Markups by Sequence
Bid S--151: OPTION 1 REPLACE PIPE CULVERTS IN-KIND

Item Code	Description	Quantity	Unit	Approx. Unit Cost	Total Cost
2.110	FLOATING TURBIDITY BARRIER The Contractor shall be responsible for the relocation of turbidity barrier and for the maintenance of an effective safety program at the job site throughout all the phases of construction.	620.00	LF	24.00	14,880.00
2.310	SHEET PILE COFFERDAM SYSTEM FOR DEWATRING AND EXCAVATION OLD STRUCTURES (WORK WILL BE DONE IN TWO PHASES) INSTALL TEMPORARY FOUR (4) PUMPS OF 42", TO BYPASS 550 CFS, THROUGHOUT THE WET SESSION FOR THREE MONTHS	20,500.00	SF	22.00	451,000.00
2.320	DEWATRING SYSTEMS AT BOTH SIDES OF THE STRUCTURES	1.00	LS	125,000.00	125,000.00
2.504	FINAL GRADING AND SLOPE EMBANKMENT FILL "Finish shaping of embankments Earth embankment to 3:1 slopes".	1.00	LS	15,000.00	15,000.00
2.510	REBUILD ROADWAY ABOVE NEW BOX CULVERT "Roadway and Embankment Earthwork Cut & Fill, hauling, placing and compacting".	560.00	SY	32.00	17,920.00
3.010	EXCAVATE OLD PIPE CULVERT STRUCTURE INCLUDING HAULE FOR SITE CROSS SECTION OF (200 + 40) /2 X 15' DEPTH X 80' LONG / 27	5,500.00	CY	10.00	55,000.00
3.020	BACKFILL AND COMPACTION INCLUDING EMBANKMENT WORK Backfill and compaction will be done after the installation of the box culverts in each location to the specified elevation.	5,500.00	CY	12.01	66,088.18
3.030	SELECT FILL FOR CULVERTS FOUNDATION Select fill must be compacted to spec. requirement.	320.00	CY	28.00	8,959.93
3.306	REMOVE EXISTING 6 PIPE CULVERTS @ 84" DIA. INCLUDING TIMBER WALKWAY AND SLIDE GATES	1.00	LS	35,000.00	35,000.00
3.310	INSTALL NEW 6 PIPE CULVERTS @ 84" DIA. 98' LONG EACH	588.00	LF	440.00	258,719.97

CONCEPTUAL COST ESTIMATE

JACK ISMALON
LEAD COST ESTIMATOR

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

2
11/15/11
1:16 pm

Bid Item Cost Only w/Markups by Sequence
Bid S--151: OPTION 1 REPLACE PIPE CULVERTS IN-KIND

Item Code	Description	Quantity	Unit	Approx. Unit Cost	Total Cost
5.310	INSTALL SIX (6) NEW SLID GATES MANUALLY OPERATE	6.00	EA	24,000.00	144,000.00
5.320	INSTALL NEW GRATING PLATFORM INCLUDING "H" PILES SUPPOT & HANDRAIL	428.00	SF	182.00	77,896.07
2.610	INSTALL TEMPORARY FOUR (4) PUMPS OF 42", TO BYPASS 550 CFS, THROUGHOUT THE WET SESSION FOR THREE MONTHS	3.00	MONTH	135,000.00	405,000.00
2.620	FUEL CONSUMPTION FOR 550 CFS FOR ONE MONTH AROUND THE CLOCK (14 GALLON/HR X 4 PUMPS X 24 HR X 30 DAYS)=40,320 GALLON	40,320.00	GALLO	4.00	161,280.00
				Subtotal -	1,835,744.15
				MOB/DEMOB - 10.00%	176,876.13
				CONTINGENCY - 20.00%	353,752.26
				*** TOTAL *** =	2,366,372.53

CONCEPTUAL COST ESTIMATE

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LEAD COST ESTIMATOR

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

1
11/15/11
1:17 pm

Bid Item Cost Only w/Markups by Sequence
Bid S151: OPTION 2: REPLACE PIPE CULVERTS, BY ADDING HEADWALL AND

Item Code	Description	Quantity	Unit	Approx. Unit Cost	Total Cost
2.110	FLOATING TURBIDITY BARRIER The Contractor shall be responsible for the relocation of turbidity barrier and for the maintenance of an effective safety program at the job site throughout all the phases of construction.	620.00	LF	24.00	14,880.00
2.310	SHEET PILE COFFERDAM SYSTEM FOR DEWATRING AND EXCAVATION OLD STRUCTURES (WORK WILL BE DONE IN TWO PHASES) Install temporary steel sheet piling, (110' L x 95' W x 50' H), Cofferdam based on good driving conditions and using sheets 50' in length with 32 lbs of 38.5 KSI steel per SF. Material cost assumes the piling is salvaged"	20,500.00	SF	22.00	451,000.00
2.320	DEWATRING SYSTEMS AT BOTH SIDES OF THE STRUCTURES	1.00	LS	125,000.00	125,000.00
2.504	FINAL GRADING AND SLOPE EMBANKMENT FILL "Finish shaping of embankments Earth embankment to 3:1 slopes".	1.00	LS	15,000.00	15,000.00
2.510	REBUILD ROADWAY ABOVE NEW BOX CULVERT "Roadway and Embankment Earthwork Cut & Fill, hauling, placing and compacting".	560.00	SY	32.00	17,920.00
3.010	EXCAVATE OLD PIPE CULVERT STRUCTURE INCLUDING HAULE FOR SITE CROSS SECTION OF (200 + 40) /2 X 15' DEPTH X 80' LONG / 27	5,500.00	CY	10.00	55,000.00
3.020	BACKFILL AND COMPACTION INCLUDING EMBANKMENT WORK Backfill and compaction will be done after the installation of the box culverts in each location to the specified elevation.	5,500.00	CY	12.01	66,088.18
3.030	SELECT FILL FOR CULVERTS FOUNDATION Select fill must be compacted to spec. requirement.	210.00	CY	28.00	5,879.95
3.306	REMOVE EXISTING 6 PIPE CULVERTS @ 84" DIA. INCLUDING TIMBER WALKWAY AND SLIDE GATES	1.00	LS	35,000.00	35,000.00
3.310	INSTALL NEW 6 PIPE CULVERTS @ 84" DIA. 60' LONG EACH	360.00	LF	438.50	157,863.03

CONCEPTUAL COST ESTIMATE

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2
11/15/11
1:17 pm

Bid Item Cost Only w/Markups by Sequence
Bid S151: OPTION 2: REPLACE PIPE CULVERTS, BY ADDING HEADWALL AND

Item Code	Description	Quantity	Unit	Approx. Unit Cost	Total Cost
5.310	INSTALL SIX (6) NEW SLID GATES MANUALLY OPERATE	6.00	EA	24,000.00	144,000.00
5.320	INSTALL NEW GRATING PLATFORM INCLUDING "H" PILES SUPPOT & HANDRAIL	428.00	SF	182.00	77,896.07
3.340	CAST IN PLACE TWO HEADWALL WITH EXTENSION CONCRETE PAYS FOR STOP LOGS RECESS	120.00	CY	940.00	112,800.00
5.360	INSTALL SHEET PILE WINGWALLS, INCLUDES CONCRETE CAP	6,000.00	SF	64.00	384,000.00
2.610	INSTALL TEMPORARY FOUR (4) PUMPS OF 42", TO BYPASS 550 CFS, THROUGHOUT THE WET SESSION FOR THREE MONTHS	3.00	MONTH	135,000.00	405,000.00
2.620	FUEL CONSUMPTION FOR 550 CFS FOR ONE MONTH AROUND THE CLOCK (14 GALLON/HR X 4 PUMPS X 24 HR X 30 DAYS)=40, 320 GALLON	40,320.00	GALLO	4.00	161,280.00
Subtotal -					2,228,607.23
MOB/DEMOB - 10.00%					216,162.44
CONTINGENCY - 20.00%					432,324.87
*** TOTAL *** =					2,877,094.54

CONCEPTUAL COST ESTIMATE

JACK ISMALON
LEAD COST ESTIMATOR

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

1
11/15/11
1:18 pm

Bid Item Cost Only w/Markups by Sequence
Bid S-151: OPTION 3: REPLACE PIPE CULVERTS WITH CAST IN PLACE BOX CULVERTS

Item Code	Description	Quantity	Unit	Approx. Unit Cost	Total Cost
2.110	FLOATING TURBIDITY BARRIER The Contractor shall be responsible for the relocation of turbidity barrier and for the maintenance of an effective safety program at the job site throughout all the phases of construction.	620.00	LF	24.00	14,880.00
2.310	SHEET PILE COFFERDAM SYSTEM FOR DEWATRING AND EXCAVATION OLD STRUCTURES (WORK WILL BE DONE IN TWO PHASES) Install temporary steel sheet piling, (110' L x 95' W x 50' H), Cofferdam based on good driving conditions and using sheets 50' in length with 32 lbs of 38.5 KSI steel per SF. Material cost assumes the piling is salvaged"	20,500.00	SF	22.00	451,000.00
2.320	DEWATRING SYSTEMS AT BOTH SIDES OF THE STRUCTURES	1.00	LS	125,000.00	125,000.00
2.504	FINAL GRADING AND SLOPE EMBANKMENT FILL "Finish shaping of embankments Earth embankment to 3:1 slopes".	1.00	LS	15,000.00	15,000.00
2.510	REBUILD ROADWAY ABOVE NEW BOX CULVERT "Roadway and Embankment Earthwork Cut & Fill, hauling, placing and compacting".	560.00	SY	32.00	17,920.00
3.010	EXCAVATE OLD PIPE CULVERT STRUCTURE INCLUDING HAULE FOR SITE CROSS SECTION OF (200 + 40) /2 X 15' DEPTH X 80' LONG / 27	5,500.00	CY	10.00	55,000.00
3.020	BACKFILL AND COMPACTION INCLUDING EMBANKMENT WORK Backfill and compaction will be done after the installation of the box culverts in each location to the specified elevation.	5,000.00	CY	12.01	60,080.16
3.030	SELECT FILL FOR CULVERTS FOUNDATION Select fill must be compacted to spec. requirement.	320.00	CY	28.00	8,959.93
3.040	PLACE BEDDING STONE BOTTOME FOUNDATION OF THE NEW BOX CULVERT	360.00	CY	60.00	21,600.00
3.306	REMOVE EXISTING 6 PIPE CULVERTS @ 84" DIA. INCLUDING TIMBER WALKWAY AND SLIDE GATES	1.00	LS	35,000.00	35,000.00

CONCEPTUAL COST ESTIMATE

JACK ISMALON
LEAD COST ESTIMATOR

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

2
11/15/11
1:18 pm

Bid Item Cost Only w/Markups by Sequence
Bid S-151: OPTION 3: REPLACE PIPE CULVERTS WITH CAST IN PLACE BOX CULVERTS

Item Code	Description	Quantity	Unit	Approx. Unit Cost	Total Cost
3.310	THREE (4) CONCRETE BOX CULVERTS (CAST IN PLACE) AT (10' X 7') OPINING 60' LONG EACH	240.00	LF	2,250.00	539,999.92
3.340	CAST IN PLACE TWO (2) HEADWALL WITH FOUR (4) BAYS AND WINGWALLS, INCLUDES STOP LOG CONCRETE RECESS Cost includes reinforcing steel and all form works.	460.00	CY	940.00	432,400.00
5.310	INSTALL FOUR (4) 10' X 7' GATES MANUALLY OPERATE	4.00	EA	24,000.00	96,000.00
5.320	INSTALL NEW GRATING PLATFORM INCLUDING "H" PILES SUPPOT & HANDRAIL	428.00	SF	182.00	77,896.05
2.610	INSTALL TEMPORARY FOUR (4) PUMPS OF 42", TO BYPASS 550 CFS, THROUGHOUT THE WET SESSION FOR THREE MONTHS	3.00	MONTH	135,000.00	405,000.00
2.620	FUEL CONSUMPTION FOR 550 CFS FOR ONE MONTH AROUND THE CLOCK (14 GALLON/HR X 4 PUMPS X 24 HR X 30 DAYS)=40,320 GALLON	40,320.00	GALLO	4.00	161,280.00
Subtotal -					2,517,016.06
MOB/DEMOB - 10.00%					245,118.88
CONTINGENCY - 20.00%					490,237.76
*** TOTAL *** =					3,252,372.71

CONCEPTUAL COST ESTIMATE